

local origination are expected by the owners (and by CBS) to take significantly longer. These expectations are in substantial agreement with the times determined by the Working Party to be required to complete the various tasks if all tasks are accomplished in the minimum possible times. It should be noted that singly-owned stations were not included in the survey.

The CBS study shows the first 30 stations, located in the top 10 markets, completing the "pass through" stage in the first year. IS/WP-2's work indicates this to be somewhat optimistic. If all tasks, including governmental approvals, are accomplished in minimum feasible times, approximately 1½ years are needed to get on the air if tower space is available and approximately 2¼ years if a new tower must be built. Since the tasks include local government approvals, environmental impact statements for new towers, FCC construction permits, and the like, it is not anticipated that the minimum times (assumed to be 90 days per approval) are likely to be achieved in many markets. We believe more normal zoning, planning, and environmental approval times will result in "pass through" implementation times of 2¼ years without a tower and 3½ years with a tower. In some major markets, even longer governmental approval times are likely to be encountered. The work of the Local Area Groups (chief engineers of all stations in an area), enlisted by IS/WP-2 in five major cities, determined in four of them that adequate tower space is not currently available for HDTV transmission. The very fact of our inquiry has stimulated the chief engineers in several of these communities to look further into the problems they will face and to begin identifying possible solutions to them.

The staggering of conversions anticipated by both CBS and the group owners surveyed (even with their assumptions about conversion time) results in approximately 50 per cent of the stations reaching "pass through" after five years. CBS indicates that most of the stations converting after the first five years will be smaller stations, many in smaller markets.

It must be recognized that the time at which stations receive uncontested channel assignments is the starting point for calculating the various time aspects of the transition to HDTV. It is anticipated that the FCC will make channel assignments during the process of establishing the rules for HDTV service. If the channel assignments are made later, the time taken to make the assignments will add directly to the implementation time. Similar consideration must be given to the documentation and dissemination of the technical details of the selected system sufficient for manufacture of both broadcast and consumer equipment, or a similar addition to the implementation time will be required.

### **Manpower Resources to Accomplish Conversion**

One area which the Working Party has been exploring is the availability of qualified personnel to carry out the design work required to implement the conversion to HDTV. This concerns two distinct aspects of design - transmission facilities and studio or production facilities. The survey of group owners showed that there is a small resource available from headquarters operations of some to supplement the personnel at the stations in designing the new facilities. In addition, some owners may be able to provide some assistance to the stations by moving personnel between their operations on a temporary basis to carry out the conversions. This reinforces the need to have some stations convert later in order to help others convert sooner. Assuming such staging of stations, adequate personnel seem to be available to reach the "pass through" stage in the time frames discussed above, especially if vendors and consultants can pick up a

significant part of the transmitter work effort.

The personnel requirements are far more acute for the studio conversion for local origination than for the transmitter and studio "pass through." This results from the fact that the studio conversion represents a much greater change and a much greater expenditure. It is also likely to take considerably longer to achieve because of the magnitude of the conversion required.

### **Consumer Electronics**

Another aspect of the Working Party's effort has been to investigate the time expected for consumer electronics manufacturers to begin production and sales of receivers compatible with the new transmission system. IS/WP-2 has consulted with receiver manufacturers and developed a time schedule, reflected in PERT charts and timelines, for the development and introduction of television receivers. The current estimates is that it will take approximately 3½ years from the time that adequate information for product design becomes available to the manufacturers for product to begin entering the distribution chain. Separately, PS/WP-5 has made forecasts of the penetration over time of HDTV receivers in the marketplace.

When considering time forecasts for implementation, the starting point for system-specific equipment design is the availability of adequate technical information. The first major task in the implementation is the design of products and their introduction into the marketplace. Translating the penetration data developed for HDTV receivers by PS/WP-5 into this context is necessary before actual dates can be applied to the penetration forecast. The penetration forecast currently starts with 1 per cent penetration of HDTV sets and extends to between 5 and 10 per cent 5 years later. Working backwards, an optimistic estimate by PS/WP-5 is that 1 per cent may be reached two years after product introduction, depending solely on cable and rental tape as program sources. The work of IS/WP-2 on the timing of receiver development indicates that receivers may be generally introduced approximately 2½-3 years after the FCC Report and Order, provided full technical information is available at the time of the NPRM. Some believe that the successful proponent may, in some cases, have a small time advantage. This indicates that 1 per cent penetration may be reached 4 to 5 years following the FCC Order.

### **Availability of Technical Information**

Time will be required to develop a description of the selected system sufficiently complete to permit the design and manufacture of consumer electronics and professional equipment products. The information currently being provided to the Advisory Committee through SS/WP-1 is not sufficient for such a purpose. Expectations with respect to and a mechanism to accomplish dissemination of the required information are yet to be determined.

Details to support the discussion above and information regarding other work of the Working Party are available upon request.

IS/WP2-0158  
19 NOV 91

To : TV Manufacturers  
From : Implementation Subcommittee, Working Party 2  
Advisory Committee On Advanced Television Service

11-19-91

The IS/WP2 on ATV Transition Scenarios is soliciting your inputs on the attached PERT and GANT charts that were created as a typical development process for HDTV receivers. A list of supporting assumptions is also included that was used in developing the charts. This schedule is intended to represent that applicable to a non-proponent of an HDTV system, and it has been developed from the inputs of several TV manufacturers.

Is the timing, from start-to-production, reasonable in your opinion? Yes ☐ No ☐  
If not, what portions would you add, delete, or change?

What can be done to shorten the time to production?

If you also manufacture VCR's, would the timing be similar as for the TV case? Yes ☐ No ☐  
If not, how would it be different?

The IS/WP2 needs this information returned to the EIA by December 12, 1991, so we request your prompt reply to this questionnaire.

IS/WP2-0139  
18 AUG 91  
19 SEP 91  
11 NOV 91  
3 DEC 91

**IS/WP2 CONSUMER PERT CHART**  
**SUPPORTING LIST OF ASSUMPTIONS**

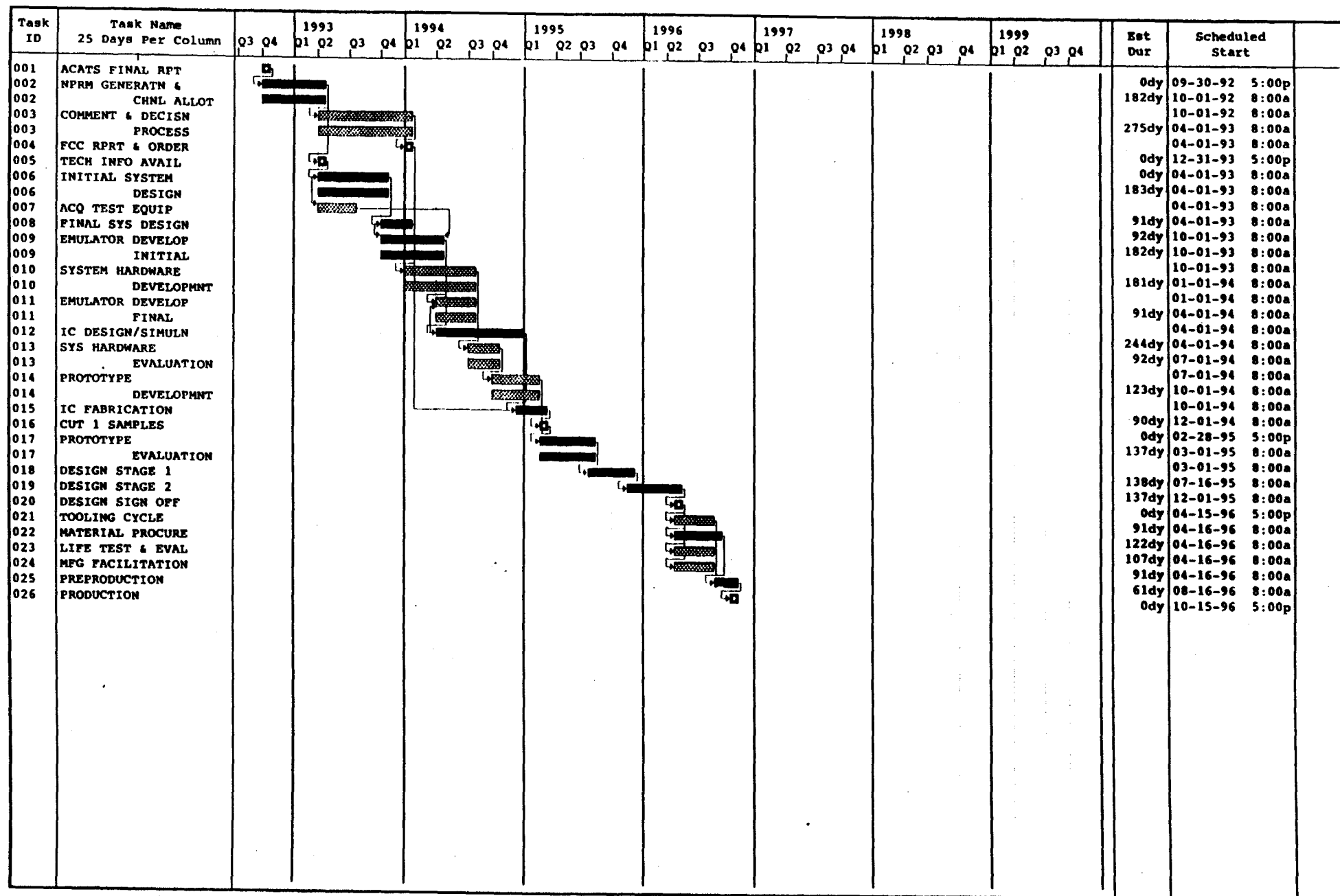
1. PERT assumption is for general market availability of HDTV product. A Proponent may have a potential 9 month advantage if his system is selected.
2. Sufficient public domain information will be available to begin meaningful work at the time of NPRM generation. (Block 002)
3. IC fabrication will not begin until FCC final report and order has been released. (Block 004)
4. No resource limitations on IC development.
5. High resolution displays will be available.
6. IC's are ASIC'S and include both standard cell custom and gate array types..
7. IC emulators are required for the more complex ASIC'S. (Block 009)
8. IC design/simulations can begin three months prior to emulator completion. (Block 012)
9. IC development assumes one major and one minor modification of the layout.

Task Outline  
11-18-91 12:50a

IS/WP2-0154  
19 NOV 91

Project: CONSPROD.PRJ  
Revision: 6

CONSUMER PRODUCTS: TELEVISION RECEIVER DESIGN/PRODUCTION



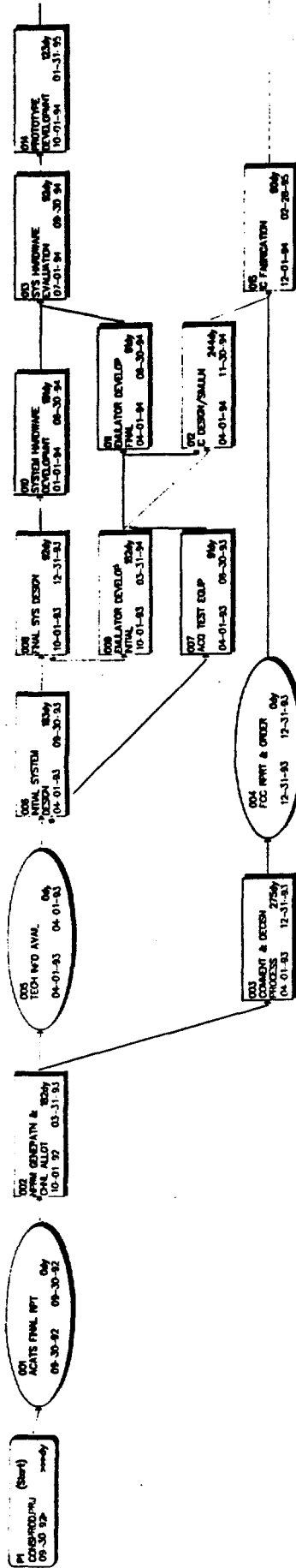
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— Interrupted

▨ Noncritical

■ Critical

▣ Milestone



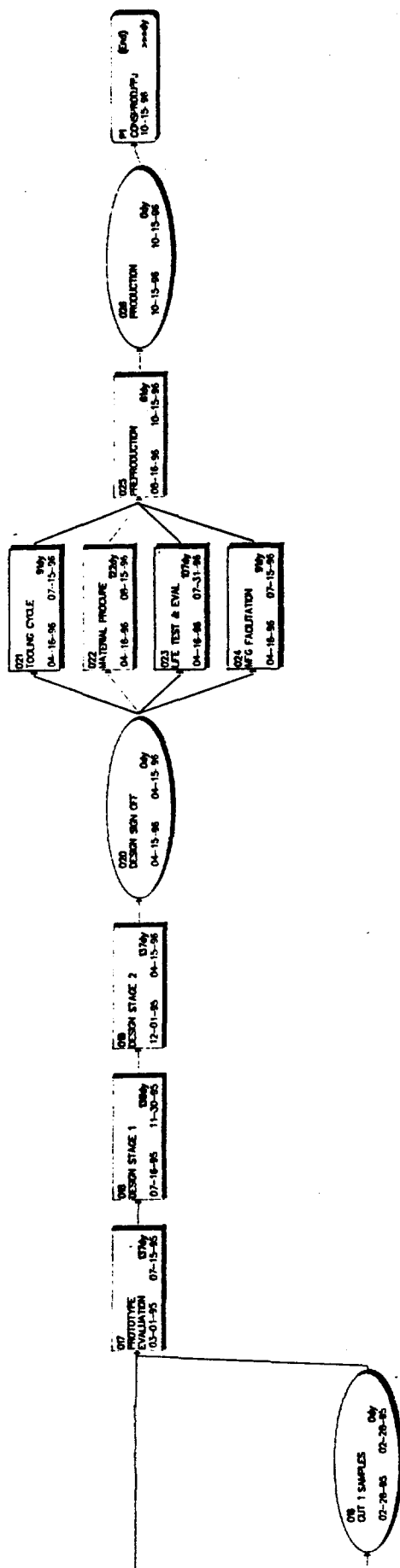
001 002 003 004 005 006 007 008 009 010 011 012 013 014 015 016 017 018 019 020

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Task Name  
Task ID  
Task Type  
Task Status  
Task Date  
Task Time

IN RECEIVER DESIGN/PRODUCTION



14 NOV 91

**IS/WP-2****SUPPORTING LIST OF ASSUMPTIONS****CABLE TELEVISION****GENERAL ASSUMPTIONS**

1. Cable TV headend equipment vendors will begin development work and testing on new equipment (processors, modulators and scrambling systems) as soon as a proponent is chosen for standardization.
2. Cable TV Networks and broadcasters will announce plans to provide HDTV service.
3. Cable TV headends will be reconfigured as required in a staged scenario.
4. Cable TV local origination and local "ad insertion" will closely follow the small TV broadcast studio scenario.
5. New HDTV standard will be compatible with existing NTSC distribution system, therefore; Cable TV distribution (coaxial, microwave, satellite, and fiber) facilities will not require rebuilding, if channel capacity is available.
6. Existing Cable TV coaxial distribution facilities are either currently being rebuilt or replaced with FIBER to provide a higher standard of service, at a 20%/year rate, and additional channel capacity.
7. New Cable TV distribution facilities are being constructed with a higher standard of service and additional channel capacity.
8. Change in consumer devices will be gradual, therefore; set-top converters/descramblers changeout will also be gradual.
9. Compression is not considered separately, but as a subset of all other assumptions.



## IS/WP-2

### SUPPORTING LIST OF ASSUMPTIONS

#### CABLE TELEVISION

##### Specific Assumptions

Task XXX - Add HDTV Simulcast Broadcast Channel To Cable TV System; existing reception antenna.

##### A. ASSUMPTIONS

1. Cable TV system has channel capacity to add new HDTV channels.
2. Simulcast will be transmitted from same tower location as NTSC transmission, therefore; does not require new reception antenna.
3. Install new equipment without interruption of other channels.
4. Headend building has existing physical plant (space, HVAC, Electrical supply) capacity to add new equipment.

##### B. Equipment

1. Hetrodyne Processor

##### C. Effort

1. 1 Technician  
1/2 day preliminary planning  
30-60 days order and receive equipment  
1/2 day installation

Task XXX - Add HDTV Simulcast Broadcast Channel To Cable TV System on a different cable channel; new reception antenna.

A. ASSUMPTIONS

1. Cable TV system has channel capacity to add new HDTV channels.
2. Simulcast will be transmitted from different tower location, or on a different channel, as NTSC transmission, therefore; does require new reception antenna.
3. Install new equipment without interruption of other channels.
4. Headend building has existing physical plant (space, HVAC, Electrical supply) capacity to add new equipment.

B. Equipment

1. Hetrodyne Processor
2. Reception antenna

C. Effort

1. 1 Technician
  - 1 day preliminary planning
  - 30-60 Cable tower inspection/load evaluation for new reception antenna placement and load
  - 30-90 days order and receive equipment
  - 1 day supervise contractor; new reception antenna installation
  - 1/2 day equipment installation

Task XXX - Add HDTV Simulcast Satellite Channel To Cable TV System; existing reception antenna.

A. ASSUMPTIONS

1. Cable TV system has channel capacity to add new HDTV channels.
2. Simulcast will be transmitted from same satellite as NTSC transmission, therefore; does not require new reception antenna.
3. Install new equipment without interruption of other channels.
4. Headend building has existing physical plant (space, HVAC, Electrical supply) capacity to add new equipment.

B. Equipment

1. Satellite Receiver
2. Modulator
3. Scrambling encoder

C. Effort

1. 1 Technician
  - 1/2 day preliminary planning
  - 30-60 days order and receive equipment
  - 1 day installation

Task XXX - Add HDTV Simulcast Satellite Channel To Cable TV System; new reception antenna.

A. ASSUMPTIONS

1. Cable TV system has channel capacity to add new HDTV channels.
2. Simulcast will be transmitted from different satellite as NTSC transmission, therefore; requires new reception antenna.
3. Install new equipment without interruption of other channels.
4. Headend building has existing physical plant (space, HVAC, Electrical supply) and real estate capacity to add new equipment.

B. Equipment

1. Satellite Antenna
2. LNB's
3. Satellite Receiver
4. Modulator
5. Scrambling encoder

C. Effort

1. 1 Technician
  - 1 day preliminary planning
  - 30-60 days order equipment
  - 1 day equipment installation
2. 3 Technicians
  - 4 days antenna installation

Task YYY - VENDOR DEVELOPMENT Design and produce Cable Television headend receiving equipment.  
[heterodyne processor, satellite receiver, modulator]

A. ASSUMPTIONS

1. HDTV Standard has been defined, and technical information released (licensed).
2. Technical issues resolved. [Distortion, bandwidth, group delay, R/L]
3. Industry standard developed and recognized.  
[Broadcast to CATV spec]

B. EFFORT

1. Equipment design
2. Lab model -- prototype
3. Design Qualification
4. Beta testing
5. Pilot production
6. Production QC testing
7. Release to market

XMTR: SIMULCAST W/NEW TOWER REQUIRED - SCENARIO 3 - TYPICAL

Task ID	Task Name 25 Days Per Column	1993		1994		1995		1996		1997		1998		1999		Est Dur	Scheduled Start	
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4			
032	FCC LICENSE																	
032	GRANT																	
033	INITIAL ON AIR																	
033	PROGRAM																	

Example

— Unassigned

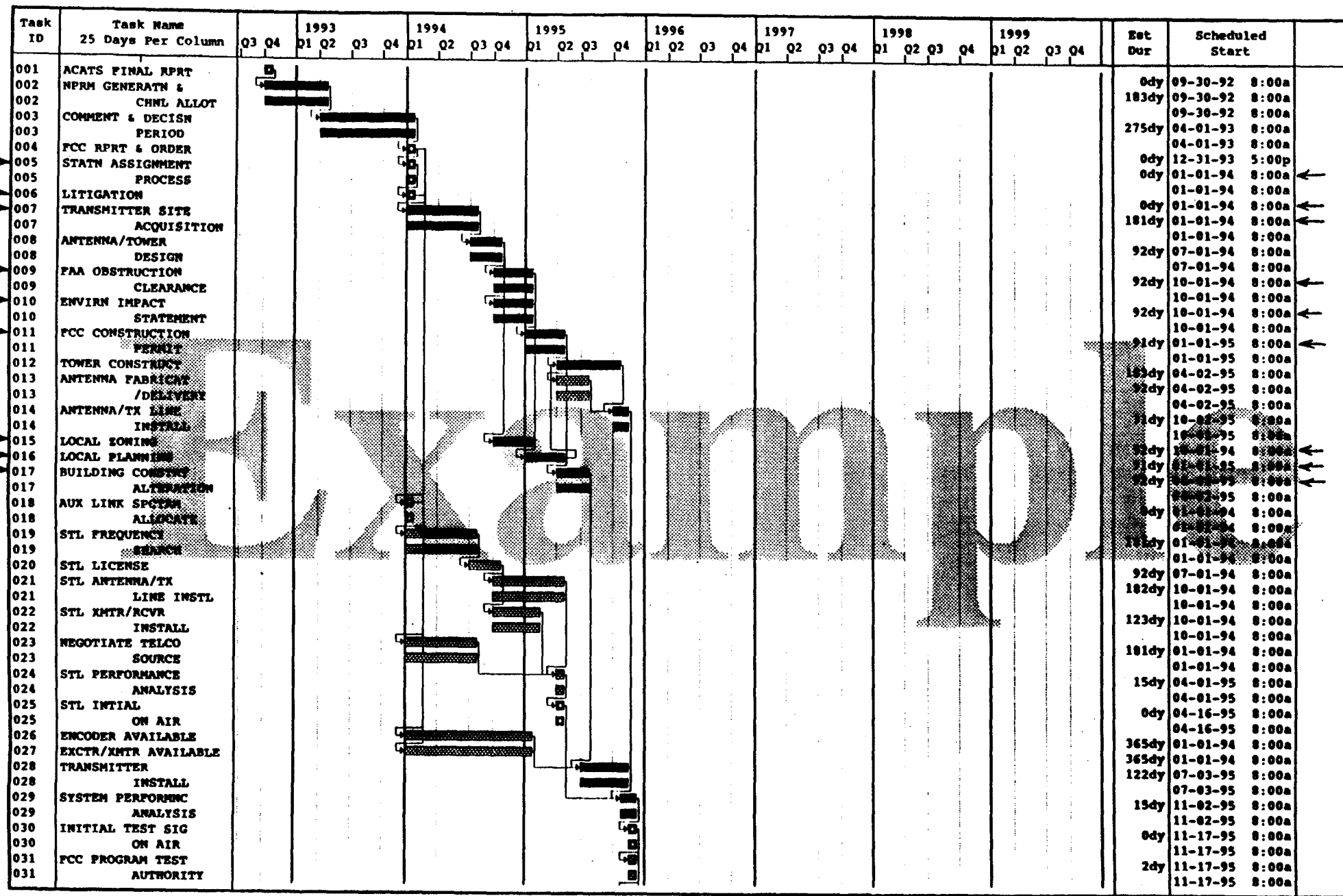
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■ Noncritical

■ Critical

■ Milestone

XMTR: SIMULCAST W/NEW TOWER REQUIRED - SCENARIO 3 - MINIMUM



— Unassigned — Interrupted ■ Noncritical ■ Critical ■ Milestone